SERVICE

SERVICE MANUAL

COMPACT 3000

Mod. 3000 92X
Mod. 3000 93X
Mod. 3000 94X

CE

Alde®

Foreword

This service handbook is intended to assist with servicing and fault-finding in caravans and motor caravans equipped with the Alde Compact 3000 92x-94x. The handbook may also be of assistance in ordering spare parts. It also provides general information on how Alde central heating systems are designed, and how they operate.
When servicing components designed for LPG and 230 volts, national safety regulations must be adhered to. After the boiler has been serviced, the service record must always be completed.

Alde International Systems AB
Service Department

NB! We reserve the right to make changes after this handbook has been printed.

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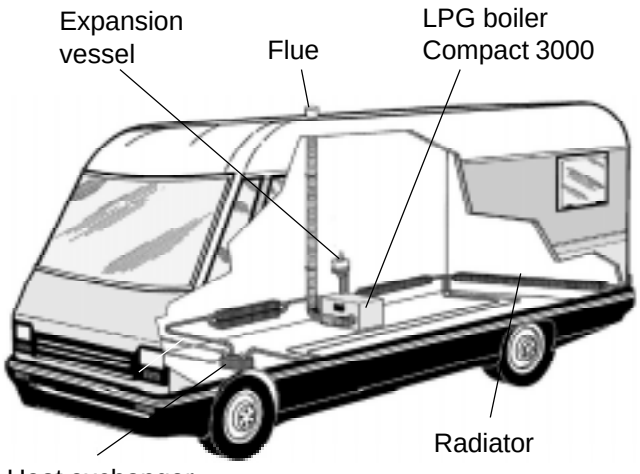
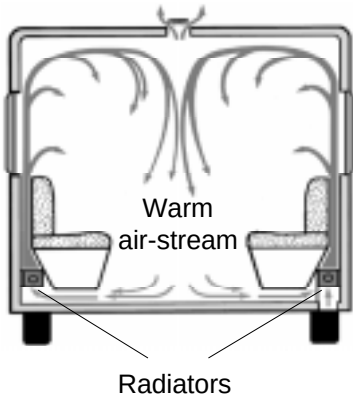
1:0 About the Alde central heating system

The central heating system uses two or three heat sources – an LPG boiler and a 230 volt electrical heating cartridge, as well as an externally-fitted heat exchanger for motor caravans. The LPG boiler/heating cartridge heats up a liquid mixture consisting of water (60%) and glycol (40%). With the aid of a 12-volt circulation pump, which is located in an expansion vessel, the warm glycol/water mixture is circulated round the system through pipes and radiators.



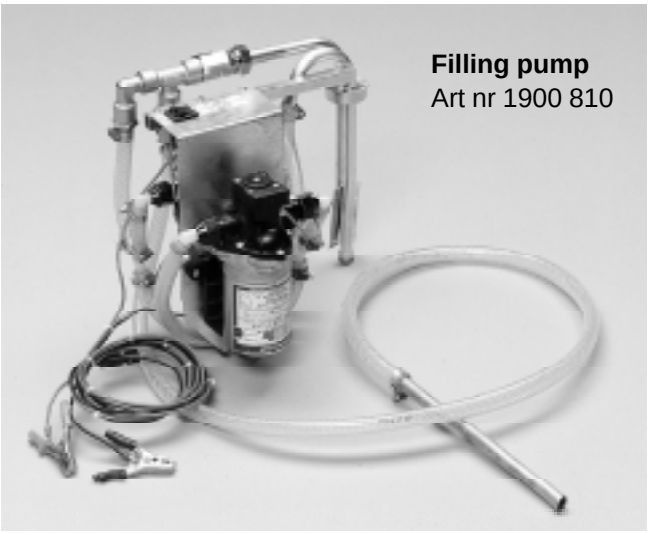


The radiators, which are fitted along the outer walls, heat up the air, which rises and warms the walls and furniture. As the warm air rises, it forms an air-barrier which keeps the cold away from the windows.

The temperature inside the caravan is controlled by a 12-volt thermostat on the control panel.

1:1 Maintaining the heating system

Check the heating system's fluid level regularly in the expansion vessel. The level should be approximately 10 mm above the "min" mark when the system is cold. The heating system should be filled with a mixture of water and glycol. For preference, use high quality pre-mixed glycol (with inhibitor) intended for use in aluminium heating systems. If using concentrated glycol, the mixture should consist of 60% water and 40% glycol. If the heating system will be exposed to temperatures below –25°C, the glycol content must be increased, but not to more than 50%.
Any vessels used in handling the liquid must be spotlessly clean, and the pipes in the heating system must be free of contamination. This will prevent the growth of bacteria in the system. The glycol mixture should be changed every second year, since its ability to protect against corrosion, for example, will deteriorate.
The glycol content should be checked before topping up with new liquid. This will ensure that the concentration of glycol in the mixture is not too high.
If the fluid level in the expansion tank falls for reasons other than evaporation, check all joints, drain cocks and bleeder screws to ensure that they are not leaking. If the glycol-water mixture leaks out, rinse with water and wipe up.
Never allow the heating system to stand empty of glycol fluid.



Filling pump
Art nr 1900 810

Adding liquid:
Ensure that the vehicle is standing level, and check that the bleeder screws and drain cocks are closed. Release the plastic nut on the circulation pump, located on the expansion vessel, and lift out the pump. Pour the glycol mixture slowly into the expansion vessel, using a watering can. When the system is being filled, air-pockets may form, depending on how the pipe-system has been installed. A good indication that there is air in the system is when the heat only travels a few metres along the pipe from the boiler, despite the fact that the circulation pump is operating.
To make refilling and bleeding easier, we recommend using the Alde filling pump which quickly both fills and bleeds the system automatically.

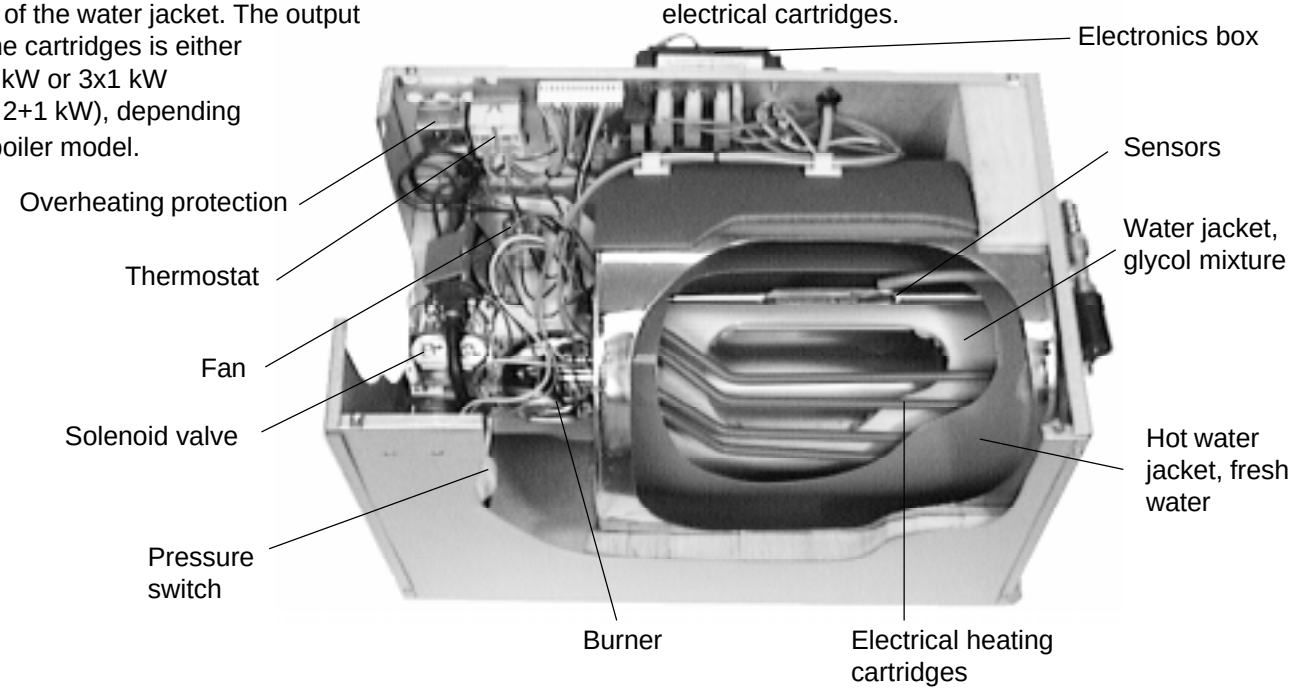
Bleeding a caravan heating system (manually):
The LPG boiler must be switched on and the circulation pump switched off. Start by opening the bleeder screws (please refer to the vehicle instruction book for their location). Leave them open until liquid escapes through the spout at the air screw. Switch on the circulation pump and let it run for a while. Check whether the pipes and radiators all around the caravan are warm.

If air still remains in the system, try the following:
The LPG must be switched on and the circulation pump switched off. Lower the front of the caravan as far as possible using the jockey wheel. Leave it in this position for several minutes, to allow any air to rise to the highest point in the system. Open the bleeder screw at the highest point and keep it open until all the air has escaped. Raise the front of the caravan as high as possible using the jockey wheel, and repeat the process. Return the caravan to a horizontal position and start the circulation pump. Check that the heat is circulating all around the caravan.
When bleeding a bogey wagon or a motor caravan, it is easier to park on a steep slope, or raise the vehicle using a jack.

2:0 About the Compact 3000

The set-up of the boiler
The boiler consists of three eccentrically-fitted pipes. The innermost pipe is a heat exchanger made from extruded aluminium. This is surrounded by a water jacket containing a 40% glycol mixture which is the fluid for the heating system. The fresh-water heater is located outside the water jacket. The two outer pipes, as well as their ends and connections, are made from stainless steel.
The heat exchanger is divided into two semi-circular parts by a u-shaped baffle plate. The burner is located in the upper semi-circle, the combustion chamber. The baffle plate leads the flue gases back into the lower part of the section, which constitutes the convection part.
The burner unit is fitted on the end of the heat exchanger. It consists of a combustion fan, burner, solenoid valve with built-in relief valve and intake/exhaust connections. The exhaust gases escape through the inner tube, and fresh air enters through the outer tube. The exhaust fumes exit the vehicle via a hose and flue fitted either to the roof or to the wall. Fresh air enters via the same flue (balanced draft).
2 or 3 electrical heating cartridges are fitted to the upper part of the water jacket. The output of the cartridges is either 2x1 kW or 3x1 kW (alt. 2+1 kW), depending on boiler model.

How the boiler works.
When the room thermostat calls for heat, i.e. the temperature in the vehicle is lower than the set room temperature, the circulation pump starts. The liquid in the heating system then starts circulating, and cold liquid enters the boiler. The boiler's operating thermostat senses that the temperature of the liquid is too low. A signal is sent to switch on the fan. When the pressure in the pressure switch is sufficiently high, a signal is sent to the electronics box to generate an ignition spark and to open the solenoid valves to allow gas to enter the system. Once the temperature in the vehicle has reached the temperature set on the room thermostat, the circulation pump stops. The operating thermostat senses that the liquid has reached the right temperature and the boiler is switched off. When the temperature of the liquid has fallen a few degrees again, the boiler restarts. This ensures that there is always hot liquid available when the room thermostat calls for heat, and that the fresh water in the boiler is always warm.
An electrical heater works in the same way, but the signal from the thermostat is sent to the relays which start the electrical cartridges.



2:1 Technical data

Measurements:	Height	Width	Depth
Boiler size:	300 mm	345 mm	490 mm
Rec.min.install.dimensions.	310 mm	400 mm	550 mm
Weigh:	16,5 kg		

Gas:

Pressure: I_{3+} 28-30/37 mbar, $I_{3B/P}$ 30 mbar, $I_{3B/P}$ 50 mbar	
Output, propane:	5,2 kW
Output, butane:	6,0 kW
Consumption, propane:	380 g/h
Consumption, butane:	430 g/h

Liquid volume/Pressure

Liquid volume, glycol mix:	4,1 litre
Liquid volume, fresh water:	8,4 litre
Max pressure, heating system:	0,5 bar
Max pressure, fresh water:	3,0 bar

230 V ~

Output electrical cartridge(2 kW):	1050+1050 W
Output electrical cartridge (3 kW):	1050+1050+1050 W

12 V DC

Current consumption:	1 amp (max)incl.circulation pump
Fuse:	2 amp

Be aware of the risks of 230 V during all service work

3:0 Faultfinding

3:1 The electrical heating cartridge does not work

Cause:

- Check that the changeover switches on the control panel are in the correct positions (see operating instruction for boiler).
- The 12 V fuse has blown.
- No or low voltage to the boiler. (< 12 V).
- 230 volt not connected.
- The overheating protection device has been triggered.
- The thermostat is broken/damaged.
- Damaged printed circuit board.
- Damaged electrical heating cartridge.
- Faulty wiring or wire connections.

Action:

During faultfinding, the hot water switch must be in the ON position and the power plug switched to 2 or 3 kW on the control panel.

- Check that the 12 V fuse (see fig. 1 A) is intact.
- Measure the input voltage. It must be no lower than 10.8 V.
- Check that the 230-volt cable is connected and that the vehicle is connected to a 230-volt outlet.
- Check that the overheating protection device has not tripped. If necessary, reset by first unscrewing the black protective cap, then pressing down the reset button (see fig. 1 B). When the overheating protection device has been reset, there must be a 12-volt **input** on one flat-pin terminal and 12-volt **output** on the other (see fig. 2 A), otherwise it is defective and must be replaced.

  N.B! If the overheating protection device has tripped it cannot be reset until the boiler has cooled 10-20°C. Before the boiler is restarted, check that it has been bled thoroughly.
- Check that the operating thermostat is turned to the maximum clockwise position (see fig. 1 C).
- Check that there is voltage (12 V) on flat-pin terminal 12 (grey cable, low temperature) and terminal 22 (blue cable, high temperature), see fig. 2. If there is no voltage on terminals 12 and 22, but there is voltage on terminal 11 (red cable), the operating thermostat must be replaced.
- Check that there is voltage on pos. 9 on the P1 printed circuit board (see fig. 3). If not, the printed circuit board must be replaced.
- Check that there is voltage on pos. 12 and 15 on the P1 printed circuit board (see fig. 3). If not, there is a fault in the wiring or on the control panel.
- Check the resistance of the electrical heating cartridge (approx. 50 ohm for 1 kW, and 25 ohm for 2 kW) and the insulation to earth (> 1 Mohm). In the event of a fault, replace the cartridge.
- Check that the wiring connections are intact and correctly fitted.
- If none of the above measures solves the problem, replace the printed circuit board. The fault will lie in the control relays for 12/230 volts.

Fig 1.

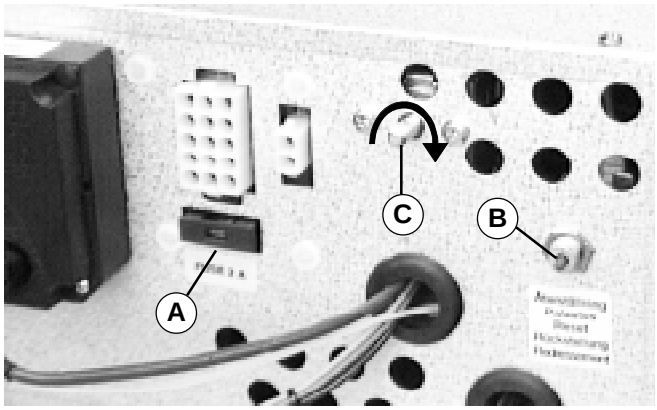


Fig 2.

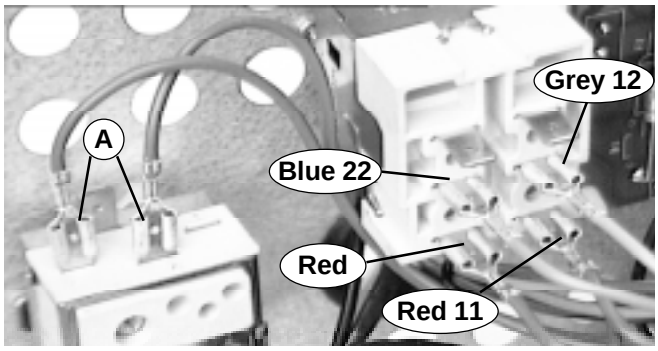
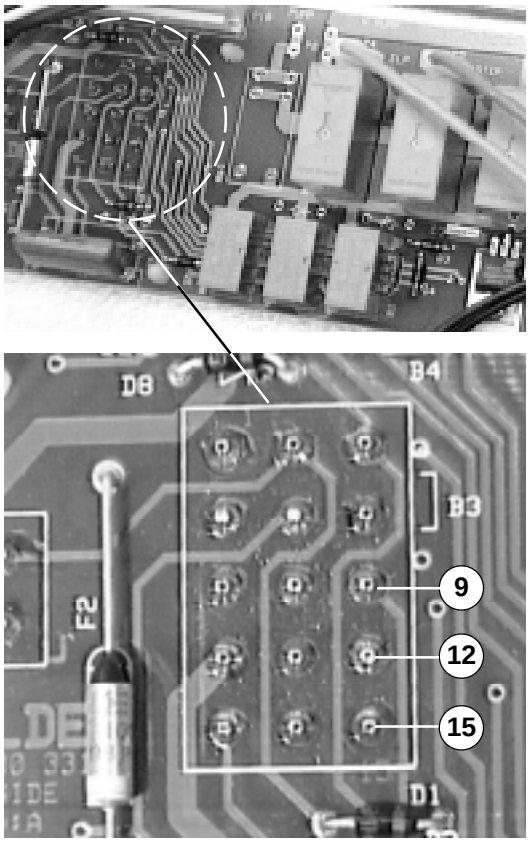


Fig 3.



3:2 The LPG boiler does not start

Initial check :

- Disconnect the ignition cable from the electronics box and start the boiler. The electronics box should make a clicking sound for about 10 seconds. If you can hear the clicking, continue to section ”3:2:3 Ignition spark is generated but the boiler fails to start”.

3:2:1 The LPG boiler shuts down on start-up

”Red LED comes on immediately”

Cause :

- Resetting time too short.
- The pressure switch does not cut out.
- Fault in electronic ignition unit.
- Faulty wiring.
- Faulty printed circuit board.

Action :

- Reset the electronic ignition unit by switching off the boiler on the control panel (the red LED goes out) and wait at least **30** seconds before attempting a restart.
- Check that the pressure switch cuts out. There should be 12 V on the white cable, connection no. 1 on the pressure switch (fig. 4 A). If there is no voltage, replace the pressure switch.
- Replace the electronic ignition unit.
- Check that the wiring connections are intact and correctly fitted.
- Replace the printed circuit board with a new one.

3:2:2 No ignition spark

Cause :

- Check that the changeover switches on the control panel are in the correct positions (see the boiler operating instructions).
- The 12 V fuse has blown.
- The overheating protection device has tripped.
- The red LED on the control panel is lit (shut-down).
- No or low voltage on the boiler (< 12 V).
- The operating thermostat is broken/damaged.
- The pressure generated by the fan is too low.
- The pressure switch does not come on.
- The printed circuit board is damaged.
- Faulty electronic ignition unit.
- Faulty wiring.

Action :

- Check that the 12 V fuse (see fig. 1A) is intact.
- Reset the electronics by switching off the boiler on the control panel (the red LED light goes out) and wait approx. 20-30 seconds before attempting to restart. If the red LED comes on again, please refer to section “3:2:1 The LPG boiler shuts down on start-up”.
- Check the incoming voltage, is must be no lower than 10.8 V.
- Check that the overheating protection device has not tripped. If necessary, reset by first unscrewing the black protective cap, then pressing the reset button (see fig. 1 B). When the overheating protection device has been reset, there should be a 12-volt input on one flat-pin connector, and a 12-volt output on the other (see fig. 2), otherwise it is defective and must be replaced.
  NB! If the overheating protection device has tripped, it cannot be reset until the boiler has cooled by 10-20°C. Before the boiler is restarted, check that it has been bled thoroughly.
- Check that the operating thermostat is turned to the maximum clockwise position (see fig. 1 C).
- Check that there is voltage (12 V) on flat-pin terminal 12 (grey cable, low temperature) and terminal 22 (blue cable, high temperature) see fig. 2. If there is no voltage on terminals 12 and 22, but there is voltage on terminal 11 (red cable), the operating thermostat must be replaced.
- Check that the hoses (fig. 5) between the fan housing and pressure switch are intact and correctly fitted.
- Check that the voltage to the fan is at least 9 volts and that no abnormal noise can be heard. If there is not 9 V +/-0.2 volt, the printed circuit board must be replaced. At 9 volts, the current consumption must be approx. 200 mA. In the event of a fault, change the fan.
- Check that the pressure switch is making a clicking noise 2-5 seconds after the fan has started, or check that there is voltage on the flat-pin terminal of the blue cable, connection no. **2** (see fig. 4 B).
- Check that the wiring connections are intact and are correctly fitted.
- Replace the electronic ignition unit. If this has no effect, replace the printed circuit board.

Fig 4.

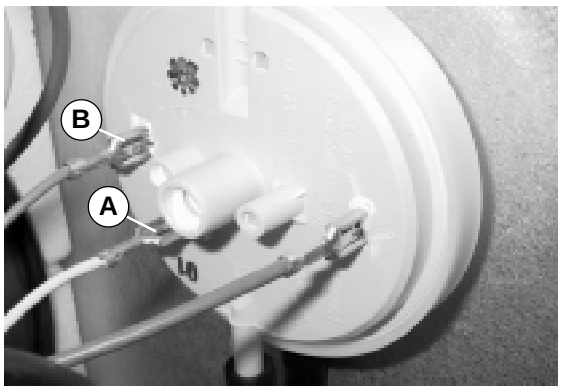
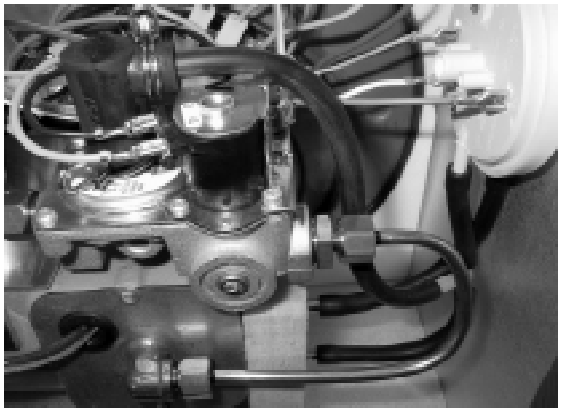


Fig 5.

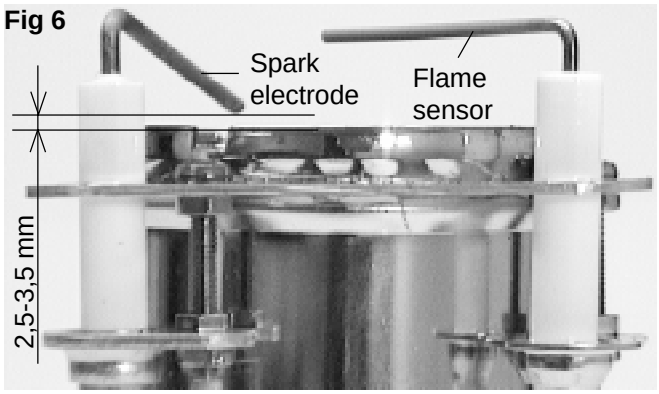


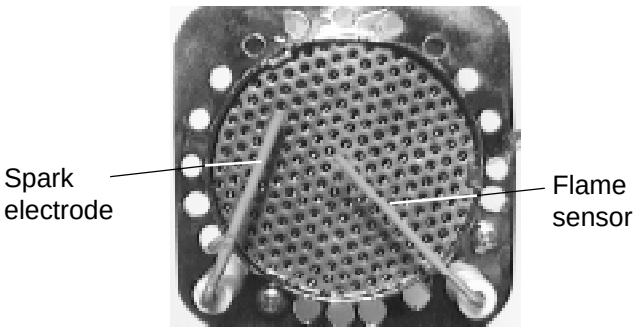
3:2:3 Ignition spark is generated but the boiler does not start

Cause :
- No or poor gas supply.
- No or faulty spark on the spark electrode.
- The solenoid valves do not open.
- Faulty soft start valve.
- Faulty electronic ignition unit.
- Nozzle blocked.
- Faulty wiring.
- Flue blocked.

Action :
- Check that the gas pressure to the boiler is correct (28-50 mbar).
- Check that the ignition cable is intact and that there are no short-circuits along the cable.
- Check when starting that voltage is being supplied to the solenoid valves. If not, replace the electronic ignition unit.
- Check that a clicking sound can be heard from the solenoid valves. Check the valves one at a time by removing the flat-pin contacts. Replace if there is a fault.
- Remove the soft start valve (see the exploded diagram) and attempt to restart. If the boiler now ignites, the soft start valve must be changed. (NB! The boiler ignites a little harder without the soft start valve).
- Remove the burner and check that the spark electrode is intact and correctly fitted (see fig. 6). Replace if necessary.
- Remove the nozzle and blow the nozzle and gas pipe clean.
- Check the wiring contact points again.
- Check that the exhaust cowl and the intake/exhaust hoses are free from objects that may obstruct the air supply.

Fig 6





3:3 The LPG boiler starts but goes out after approx. 10 seconds (red LED comes on)

Cause :
- The flame sensor cable is damaged.
- Faulty electronic ignition unit.
- Sensor damaged or incorrectly positioned.

Action :
- Check that the flame sensor cable is intact and correctly connected.
- The only way to check whether the electronic ignition unit is working is to change it and then check that the boiler is operating properly.
- Remove the burner and check that the flame sensor is intact and correctly fitted (see fig. 6). Replace the flame sensor if necessary.

3:4 The LPG boiler starts and switches off at short intervals

Cause :
- Voltage to boiler too low (< 12 V).
- Poor contact point in the wiring (earth fault).
- Pressure switch damaged or incorrectly connected.
- Ignition unstable.
- Flue blocked.

Action :
- Measure incoming voltage. It must be no lower than 10.8 V.
- Check the wiring connections, particularly the earth connections.
- Check that both hoses between the pressure switch and the fan housing are connected (see fig. 5).
- Replace the pressure switch.
- If the problem persists, please refer to “Unstable or violent ignition”.
- Check that the exhaust cowl and the intake/exhaust hoses are free from objects that may obstruct the air supply

3:5 Noisy fan

Cause :
- The fan motor is damaged (worn).
- Impeller out of balance.
- Impeller touches fan housing.

Action :
- Remove the fan and check whether the impeller has touched the fan housing (wear marks on the fan housing). If necessary adjust the fan housing axially.
- Replace the fan.

3:6 Sound from the burner

Action :

- Whistling sound from the burner on 92x-93x. Change to burner 3000 444.

3:7 Unstable or violent ignition

Cause :

- The exhaust/intake hoses are too short.
- The exhaust/intake hoses are damaged or loose.
- The exhaust cowl is blocked.
- Incorrect gas pressure.
- Blocked or faulty soft start valve.
- Faulty nozzle.
- Low spark frequency.
- The pressure switch does not shut off or has stuck.
- The solenoid valves are leaky.

Action :

- Check that the intake/exhaust hoses are at least 2 metres long and that they are undamaged and correctly fitted at the boiler and flue (if a wall flue is fitted, 0.7-1.5 m).
- Check that the flue is free from objects that may obstruct the air circulation.
- Check that the gas pressure to the boiler is correct (28-50 mbar).
- Where the ignition is unstable, remove the soft start valve and test-start the boiler. The start should now be stable, but with a more violent ignition than normal. Replace with a new soft start valve or clean the old one and carry out another test-start.
- Unscrew the nozzle and check that it is marked “230”.
- Detach the ignition cable from the electronic ignition unit and start the boiler. A clicking sound should be heard from the electronic ignition unit, with a frequency of at least 2 Hz at 12 volts (two clicks per second). If the frequency is too low the ignition electronics must be replaced.
- Check that the ignition cable is intact and that there are no short-circuits along the cable.
- Remove the burner and check that the spark electrode is correctly fitted (see fig. 6) and undamaged. Replace/adjust if necessary.
- Using a leakage tester, for example, check that no gas is passing through the boiler when it is switched off. If a leak is discovered, check that all gas connections are tight. If there is no noticeable external leakage, replace the solenoid valve

3:8 Other technical information

- The electronic ignition unit may emit a slight high frequency sound during operation.
- Boiler models 3000 92x and 300093x are intended only for roof flues.
- Boiler model 3000 94x is intended only for wall flues.
- Boilers with manuf. no. 10921 and higher have circuit board rev C, which means that the fan does not start if the pressure switch is “on”, and there is a new voltage stabilisation which handles lower voltages (10 V).
- Boilers with manuf. no. 7536 and lower may have a fault in the fan that causes a whistling sound.
- If there is a resonant noise on boiler model 3000 94x, insulate the exhaust hose with insulation hose art. no. 1900 233.

4:0 Replacing components

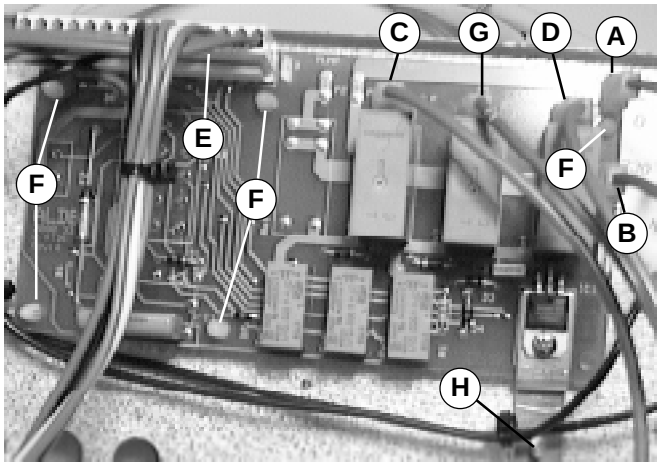
Always switch off the 12 V DC and 230 V ~ power supply, and turn the main gas cock to the ”off” position before starting any servicing.

The seals (marked in red) must NOT be broken unless special permission has been obtained from Alde.

4:1 Replacing the printed circuit board

1.Remove the cover and service panel on the boiler.
2.Detach the blue (N) (fig. 7 A) and brown (R) (fig. 7 B) cables at the cable ports on the printed circuit board, and remove the blue (N) (fig. 7 C), brown (R) (fig. 7 D) and red (R) (fig. 7 G) cables from the electrical heating cartridge.
3.Detach the white 15-point connection block (fig. 7 E) from the printed circuit board.
4.Remove the screw behind the connection block (fig 7 H).
5.Remove the printed circuit board by pressing together the hooks on the 5 plastic spacers (fig. 7 F), and pulling out the circuit board.
6.Push the new board firmly into the spacers and connect the cables as shown in fig. 7.
7.Refit the service door and cover and test-run the electrical heating cartridge.

Fig 7.



4:2 Replacing fan

1. Remove the cover and the service panel on the boiler.
2. Disconnect the positive (red, fig. 8 A) and negative (black, fig. 8 B) cables on the fan motor.
3. Unscrew the 4 plate screws (fig.8 C) securing the fan in the fan housing.
4. Tilting the fan towards the boiler body, lift it upwards out of the fan housing (see fig. 9).
5 Fit the new fan by following these instructions in reverse.
NB! Take care not to damage the impeller when fitting the fan.
6. Fit the service panel and lid and test-run the boiler.
(NB! In a small number of boilers, the gas pipe is fitted in such a way that the fan cannot be extracted without first removing the gas pipe. Do not forget to check that the seal is tight).

Fig 8.

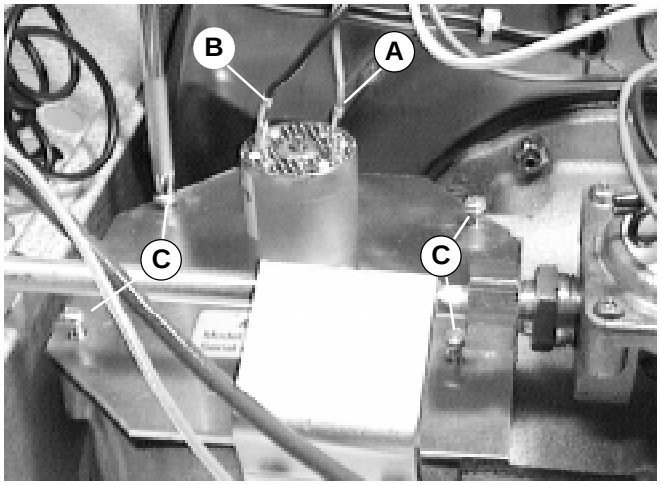
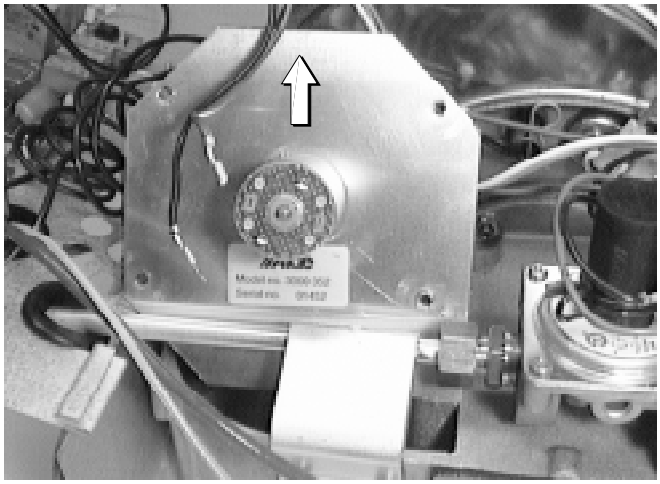


Fig 9.



4:3 Replacing a burner (older model for new model)

When a fault occurs in the burner on boiler models no. 3000 921-926, the burner should be replaced with a new model (art nr 3000 385).

1. Remove the cover and end plate from the boiler.

2. Remove the end plate (fig. 10 A) on the burner housing.

3. Detach the spark electrode and sensor cables from the electronic ignition unit.

4. Using two spanners, detach the gas pipe between the burner and the solenoid valve at both connections (fig. 10 B). Pull out the gas pipe and the rubber grommet (fig. 10 C) from the burner housing.

5. Slacken the screw (fig. 11 A) at the top of the burner housing which holds the burner in place.

6. Pull the burner straight out of the burner housing (fig. 12).

7. Fit the new, unperforated rubber grommet in the burner housing (fig. 13 A).

8. Fit the new burner (insert it straight in) and secure it via the end plate in the burner housing (fig. 13 B).

9. Secure the enclosed screw in the same place as the burner was fastened (fig. 11 A).

10. Secure the gas pipe to the solenoid valve (fig. 13 C) and to the burner (fig. 13 D). Remember to check that the cones are correctly fitted to the pipes. Using two spanners, tighten the nuts on the gas pipe to 7-9 Nm.

11. Fit the ignition spark and flame sensor cables to the electronic ignition unit

12. With the boiler operating, check the system and connections for any leaks using a leak detector spray. Once this is done, fit the end plate and cover.

Fig 10.

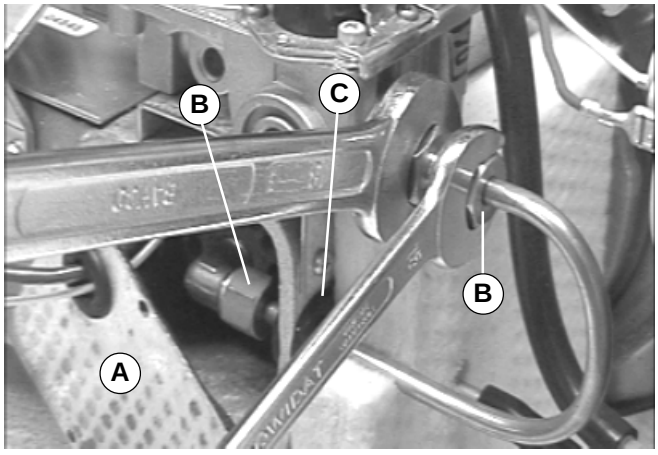


Fig 11.

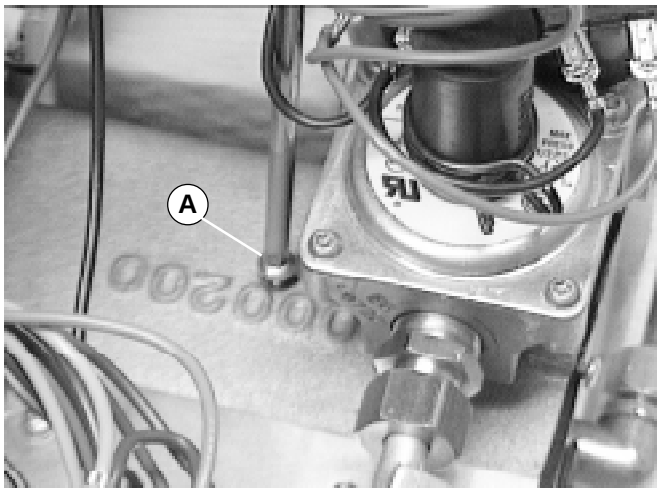


Fig 12.

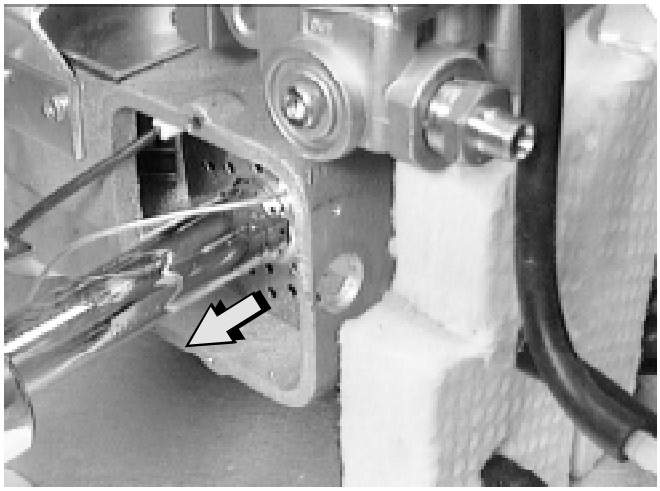
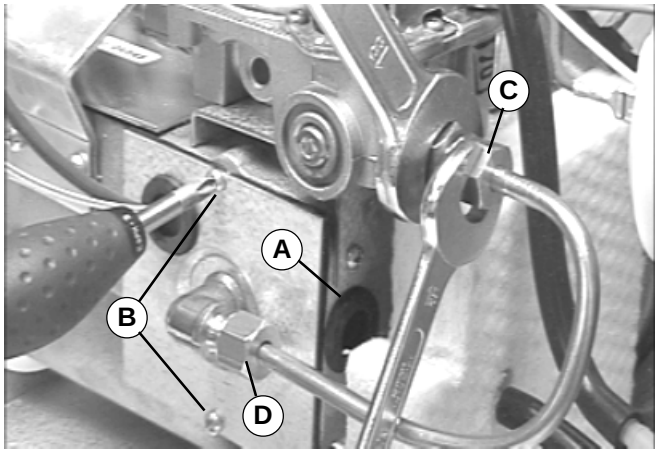


Fig 13.



4:4 Replacing a burner (new model)

Applies to boilers with model no. 3000 927 or higher.

1. Remove the cover and end plate from the boiler.

2. Detach the spark electrode and sensor cables from the electronic ignition circuitry.

3. Using two spanners, unfasten the gas pipe nuts (fig. 14 A) at the burner and the solenoid valve (fig. 14 B).

4. Detach the end plate and burner by slackening the screws (fig. 14 C) on the burner housing.

5. Pull end plate and burner straight out of the burner housing (fig. 15).

6. Fit the new burner (insert straight) and secure it via the end plate in the burner housing (fig. 14 C).

7. Secure the gas pipe to the solenoid valve (fig. 14 B) and to the burner (fig. 14 A). Remember to check that the bevels are correctly fitted. Using two spanners, tighten the nuts on the gas pipe to 7-9 Nm (fig. 14).

8. Fit the ignition spark and flame sensor cables to the electronic ignition unit.

9. With the boiler operating, check the system and connections for any leaks using a leak detector spray. Once this is done, fit the end plate and cover.

Fig 14.

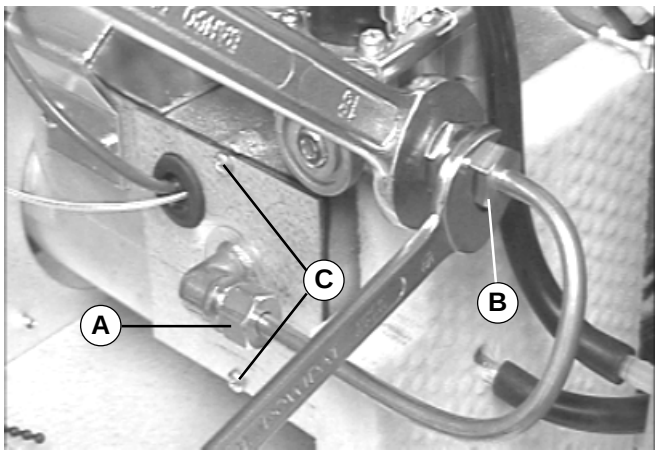
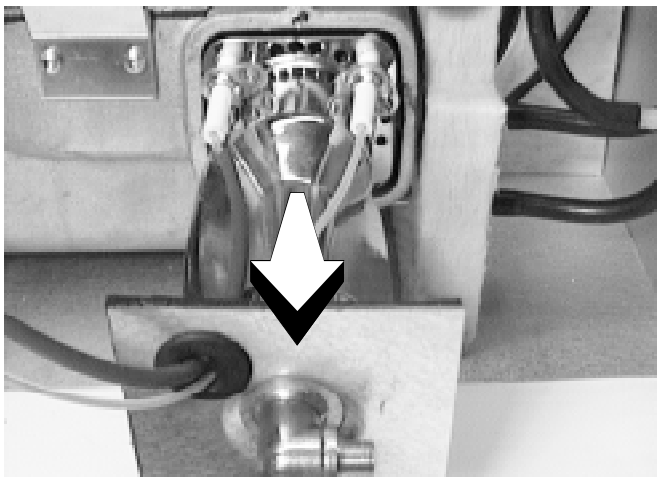


Fig 15.



4:5 Replacing the spark electrode

When replacing the spark electrode, also replace the flame sensor.

1. Detach the burner as per instructions in 4:4.

2. Remove the nut (fig. 16 A) and pull the spark electrode (fig. 16 B) straight backwards.

3. Fit the new spark electrode and secure it. Check that the distance between the tip of the spark electrode and the mesh cover of the burner is 2.5-3.5 mm, and that the spark electrode is correctly positioned (see fig. 6).

4. Fit the burner in accordance with instructions and test-start the boiler.

4:6 Replacing the flame sensor

When replacing the flame sensor, also replace the spark electrode.

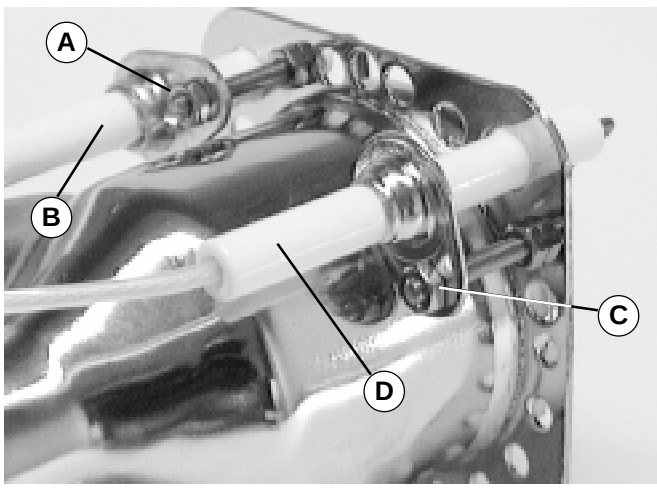
1. Detach the burner in accordance with 4:4.

2. Remove the nut (fig. 16 C) and pull the flame sensor (fig. 16 D) straight backwards.

3. Fit the new flame sensor, ensuring that the tip of the flame sensor is positioned above the burner in accordance with fig. 6. Secure the flame sensor.

4. Fit the burner in accordance with instructions and test-start the boiler.

Fig 16.



4:7 Replacing the solenoid valve

For boilers where the solenoid valve is fitted to the burner housing (up to serial no. 04444).

1. Remove the cover and end-plate on the boiler.

2. Unfasten the cables (black, brown and yellow/green) on the solenoid valve (fig. 17 A-C).

3. Using two spanners, slacken the nuts on the incoming gas pipe (fig. 18 A) and the gas pipe to the burner (fig. 18 B), and remove the rubber cap from the soft start valve (fig. 17 D).

4. Detach the pressure switch hoses to and remove the insulation next to the burner housing.

5. Unscrew the two plate screws (fig. 18 C) which fasten the gas valve angle bracket (fig. 18 D) to the burner housing.

6. Extract the solenoid valve and transfer the angle bracket to the new solenoid valve (attached underneath with a screw).

7. Fit the new solenoid valve by following the instructions in reverse order.

8. Using two spanners, tighten the nut on the incoming gas pipe to 25-30 Nm, and the gas pipe to the burner to 7-9 Nm.

Fig 17.

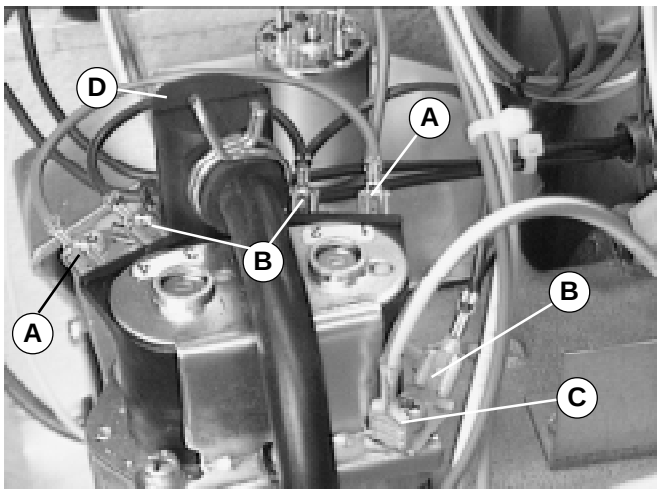
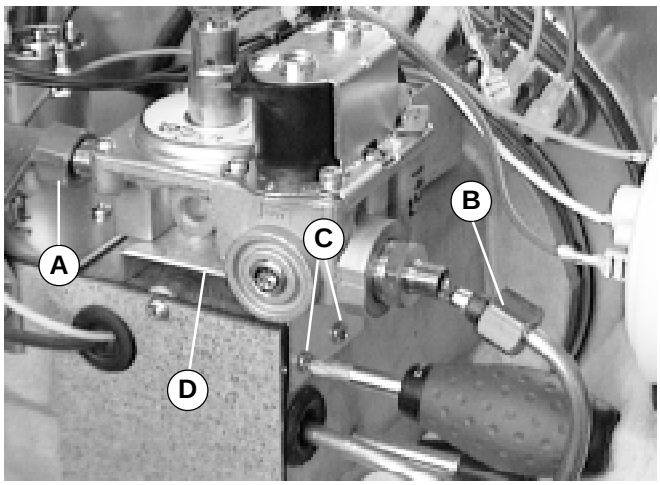


Fig 18.



Remember to check that the bevels are correctly fitted to the pipes. With the boiler operating, check the system and connections for any leaks using a leak detector spray

9. Fit the end plate and cover.

For boilers with serial numbers form 04445 and upwards.

1. Remove the cover and end plate on the boiler.

2. Unfasten the cables (black, brown and yellow/green) on the solenoid valve (fig. 17 A-C).

3. Using two spanners, slacken the nuts on the incoming gas pipe (fig. 18 A) and the gas pipe to the burner (fig. 18 B), and remove the rubber cap from the soft start valve (fig. 17 D).

4. Extract the solenoid valve (fig. 20) and fit the new one by following the instructions in reverse order.

5. Using two spanners, tighten the nut on the incoming gas pipe to 25-30 Nm, and the gas pipe to the burner to 7-9 Nm. With the boiler operating, check the system and connections for any leaks using a leak detector spray.

6. Fit the end plate and cover

Fig 19.

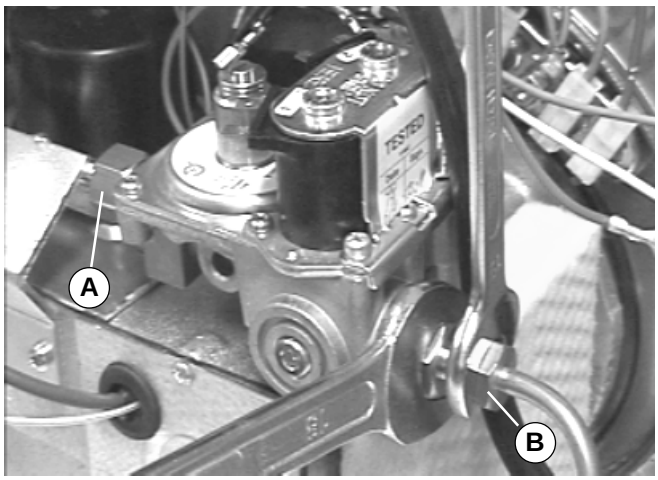
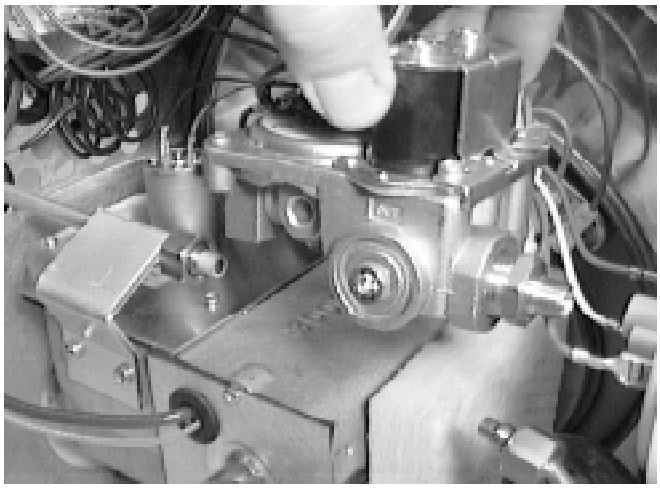


Fig 20.



4:8:1 Replacing a 1 kW heating cartridge

1. Drain the glycol mixture from the heating system.

2. Remove the cover and end plate.

3. Remove the cables from the heating cartridge.

4. Slacken the nut in the centre of the electrical heating cartridge electrode (fig. 21).

5. Give the t-screw on the heating cartridge a one-quarter turn (fig 22).

6. Extract the heating cartridge by pulling straight backwards (fig. 23).

7. Clean around the edges where the old heating cartridge has been located.

8. Then fit the new heating cartridge, give the t-screw a one-quarter turn and tighten the nut.
NB! Before fitting the heating cartridge, check the direction in which to turn the t-screw.
NB! Check that the rubber plug is fully inserted and push the lower edge of the heating cartridge while tightening the nut. Tighten the nut to 4 Nm.

9. Connect the cables according to fig. 24 (A=brown, B=blue, C=yellow/green). Fit the cover and end plate. Add glycol mixture. Bleed and test-run the boiler.

Fig 21.

Fig 22.

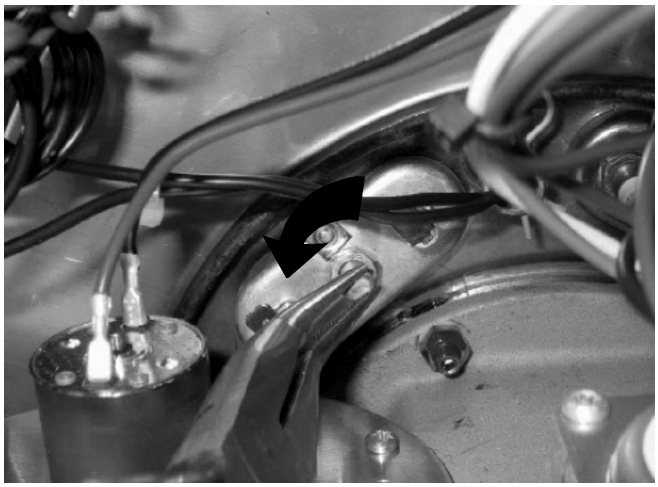


Fig 23.

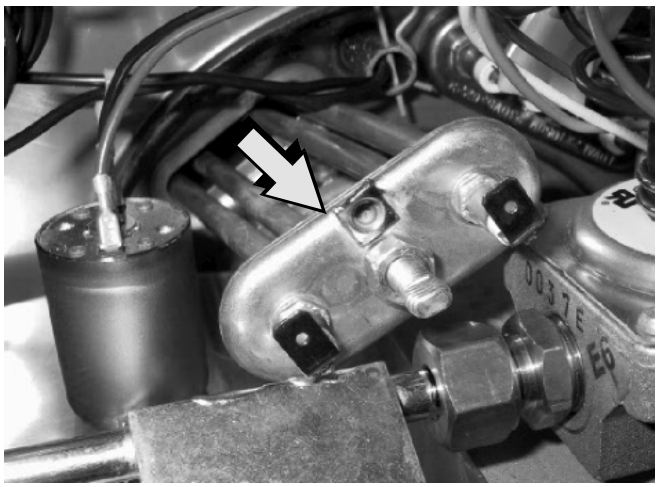
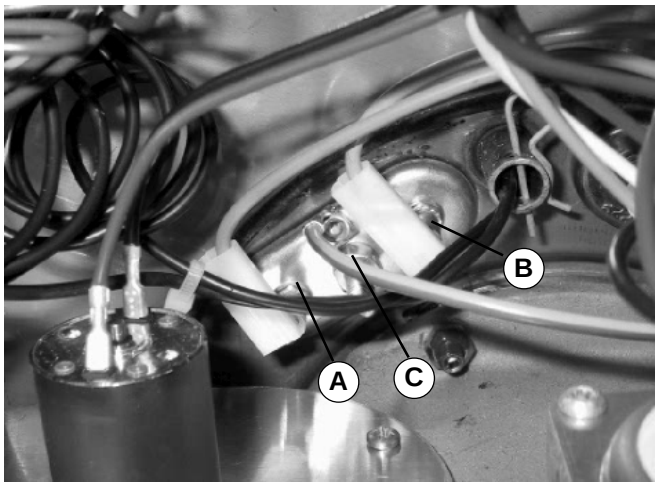


Fig 24.



4:8:2 Replacing a 2 kW heating cartridge

1. Switch off the 230 V supply.

2. Drain the glycol mixture from the heating system.

3. Remove the cover and end plate.

4. Remove the solenoid valve in accordance with section 4:7.

5. Remove the cables from the heating cartridge.

6. Unscrew the two plate screws and remove the angle bracket (does not apply to boilers with serial numbers of 4445 or higher).

7. Slacken the nut in the centre of the electrical heating cartridge electrode (fig. 25), and unscrew it approx. 10 mm.

8. Tap the nut lightly to release the rubber plug and extract the heating cartridge by pulling straight backwards.

9. Clean around the edges where the old heating cartridge has been located. Then fit the new heating cartridge, securing it with the nut so that the rubber plug expands. **NB!** Check that the rubber plug is fully inserted and push the lower edge of the heating cartridge while tightening the nut. Tighten the nut to 4 Nm.

10. Fit the angle bracket, if there is one, and then the solenoid valve in accordance with the instructions. Connect the cables in accordance with fig. 27 (A=brown, B=blue, C=yellow/green, D=red). Fit the cover and end plate. Add glycol mixture. Bleed and test-run the boiler.

Fig 25.

Fig 26.

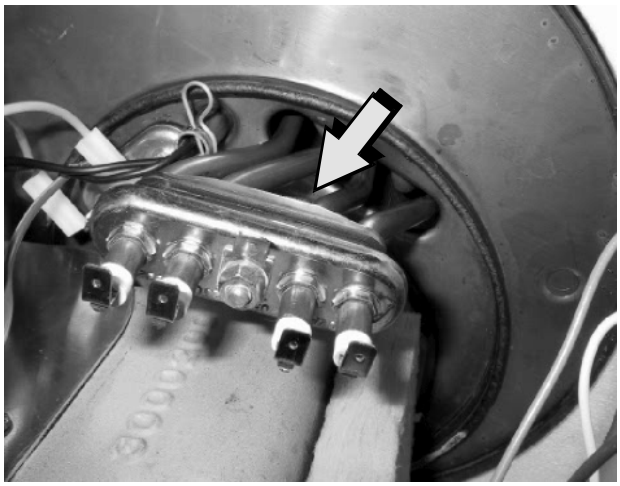
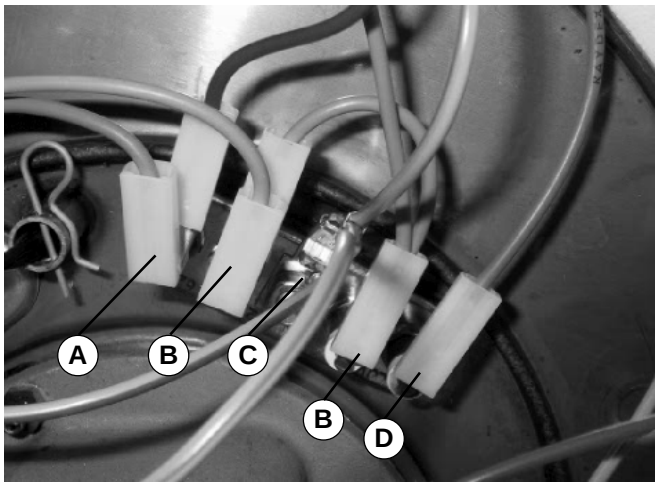


Fig 27.



4:9 Replacing the operating thermostat

1. Remove the cover on the boiler.

2. Remove the locking clip (fig. 28 A). Remove the split pin (fig. 24 B) on the immersion pipe. Remove the overheating protection device sensor first (fig. 29), and then the operating thermostat sensor (fig. 30 A).

3. Unscrew the two screws which secure the operating thermostat (fig. 31 A) to the fastening plate, and remove the cables from the flat-pin connections.

4. Transfer the contact spring (fig. 30 B) to the new operating thermostat. The spring must be fitted with the rear end of the bulb uppermost, so that it pushes the sensor downwards into the immersion pipe.

5. First insert the operating thermostat sensor all the way to the very end of the immersion pipe. Then insert the overheating protection device sensor as far as possible. Fit the split pin on the immersion pipe.

6. Attach the operating thermostat to the service panel (NB! Use the original screws only) and connect the cables in accordance with fig. 2 (blue, grey and two red).

7. Fit the cover and test-run the boiler.

Fig 28.

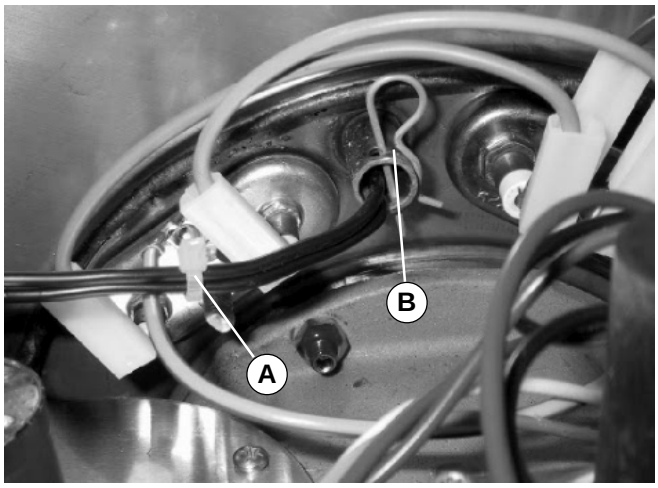
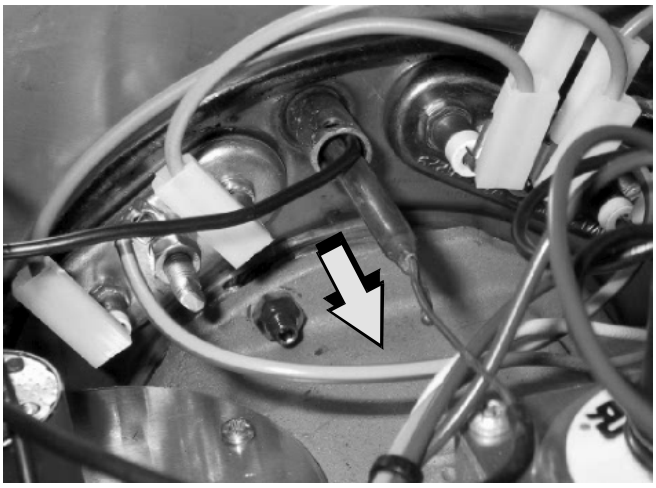


Fig 29.



4:10 Replacing the overheating protection device

1. Remove the cover on the boiler.

2. Remove the locking clip (fig. 28 A). Remove the split pin (fig. 24 B) on the immersion pipe and take out the sensor (fig. 29).

3. Remove the black plastic cap and unscrew the nut (fig. 31 B) which holds the overheating protection device to the service panel. Release the cables (fig. 2 A) from the flat-pin contacts and change the overheating protection device.

4. Fit the new overheating protection device by following the instructions in reverse order. Test-run the boiler.

Fig 30.

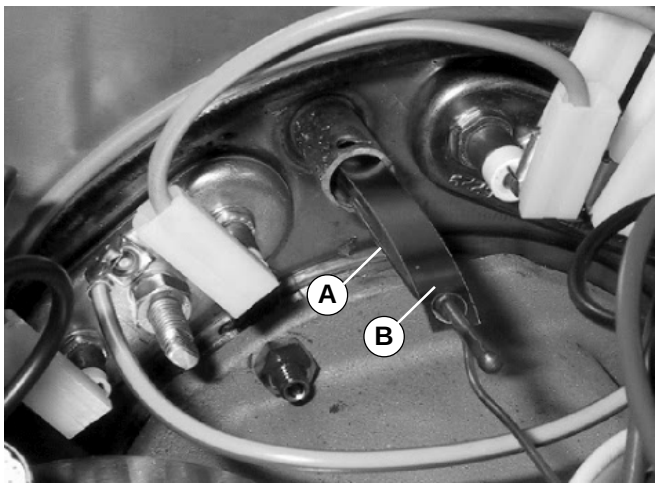
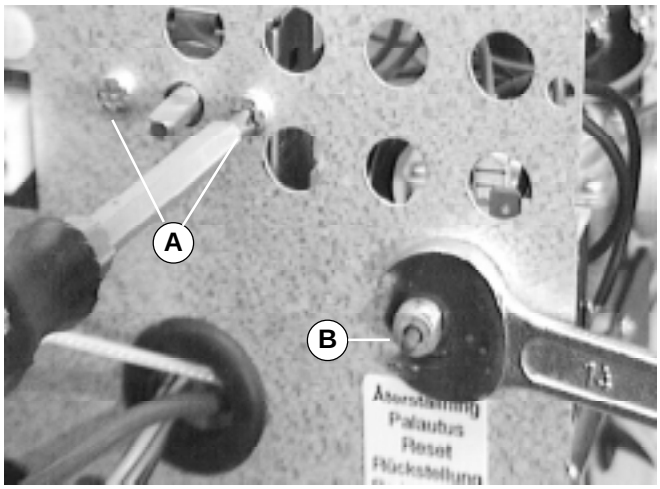


Fig 31.



4:11 Replacing the pressure switch

1. Remove the cover and end-plate from the boiler.

2. Detach the blue, white and red cables on the pressure switch.

3. Push back the metal securing plate and pull out the pressure switch (fig. 32 A).

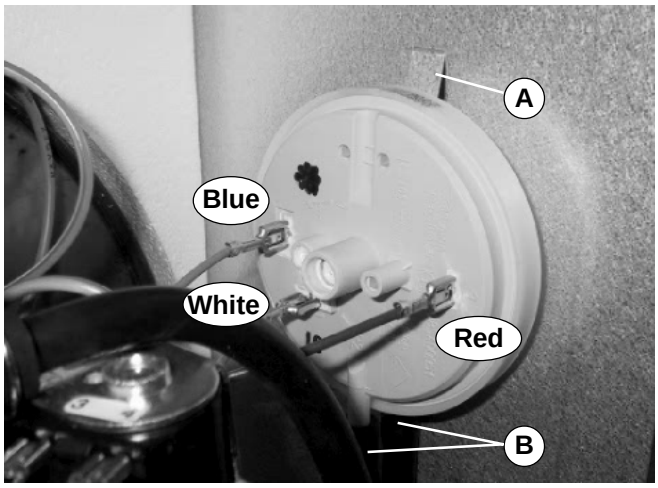
4. Detach the rubber hoses (fig. 32 B) from the pressure switch (do not pull the hoses, unscrew them).

5. Refit the hoses to the new pressure switch before pushing it into place.

6. Fasten the pressure switch and fit the cables to the flat-pin contacts in accordance with fig. 32.

7. Fit the cover and end plate to the boiler. Test-start the boiler.

Fig 32.

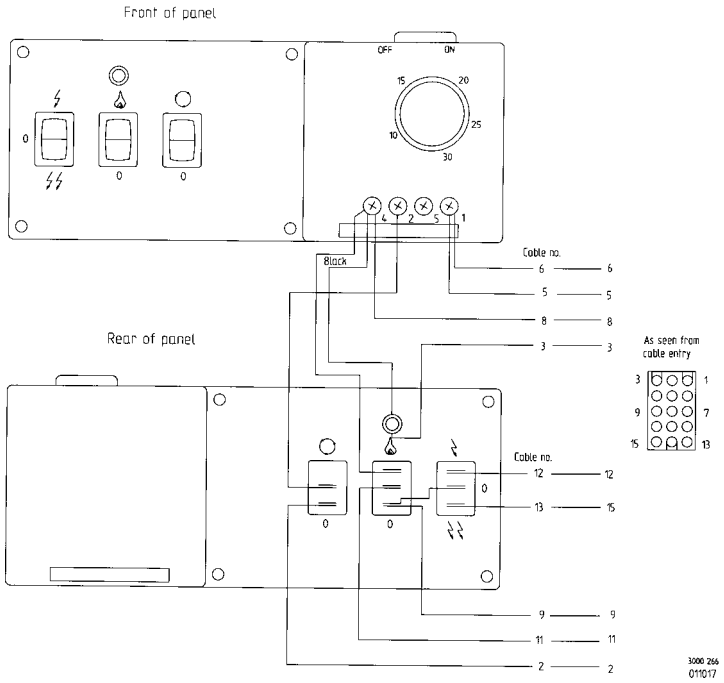


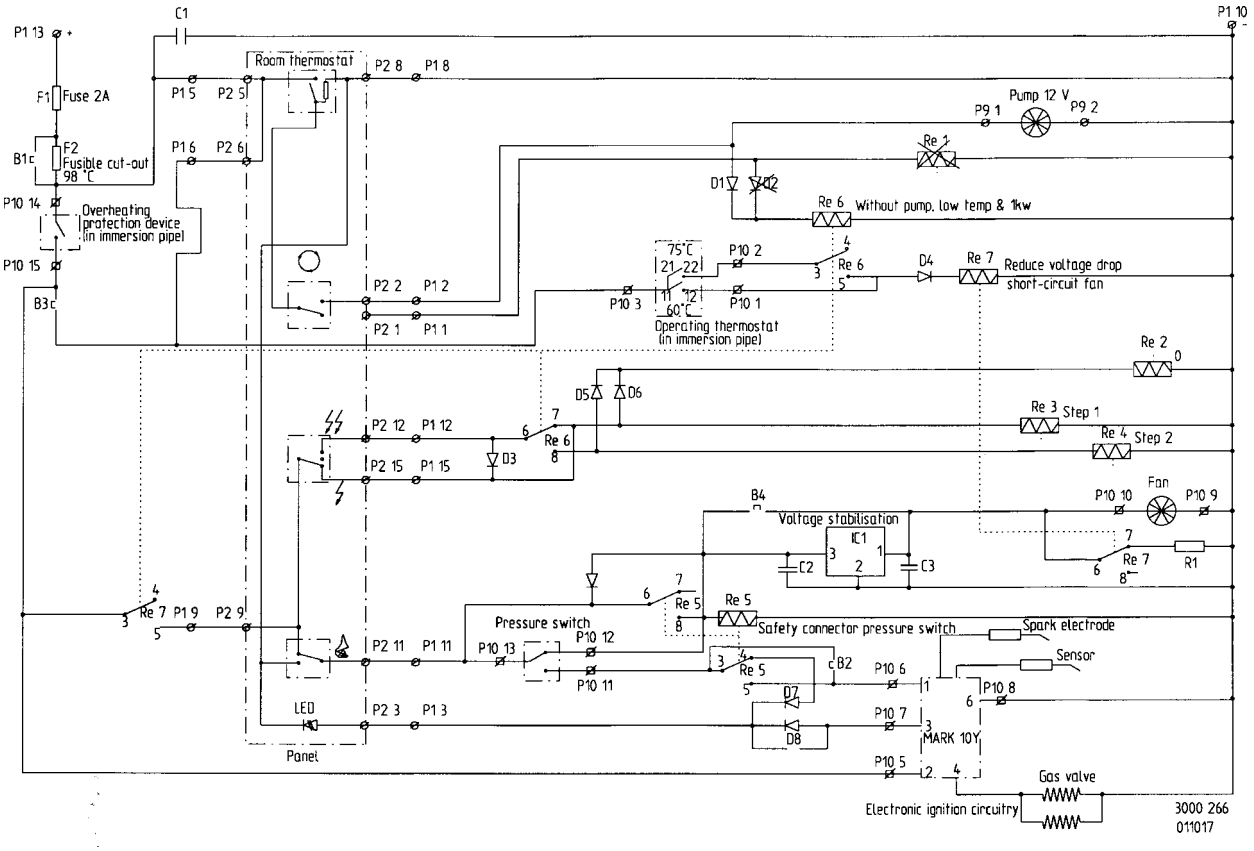
5:0 Safety check

The safety check must be carried out after every service. Check:

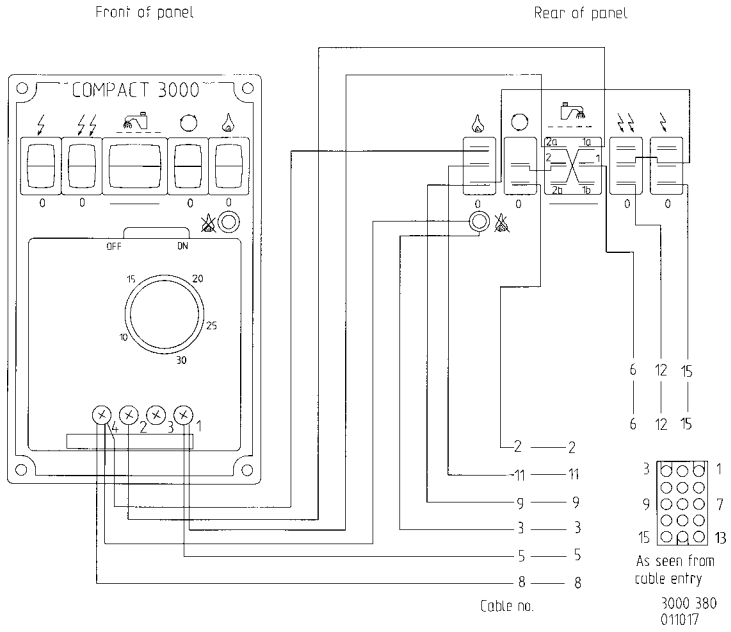
- That the intake/exhaust hoses and flue are tight and undamaged.
- That the LPG pipes are tight. Pressure test the system.
- That the 230 V~ earth cable is connected.
- That the safety valve on the water heater is not blocked.
- That the heating system is filled with glycol mixture up to the mark on the expansion vessel.

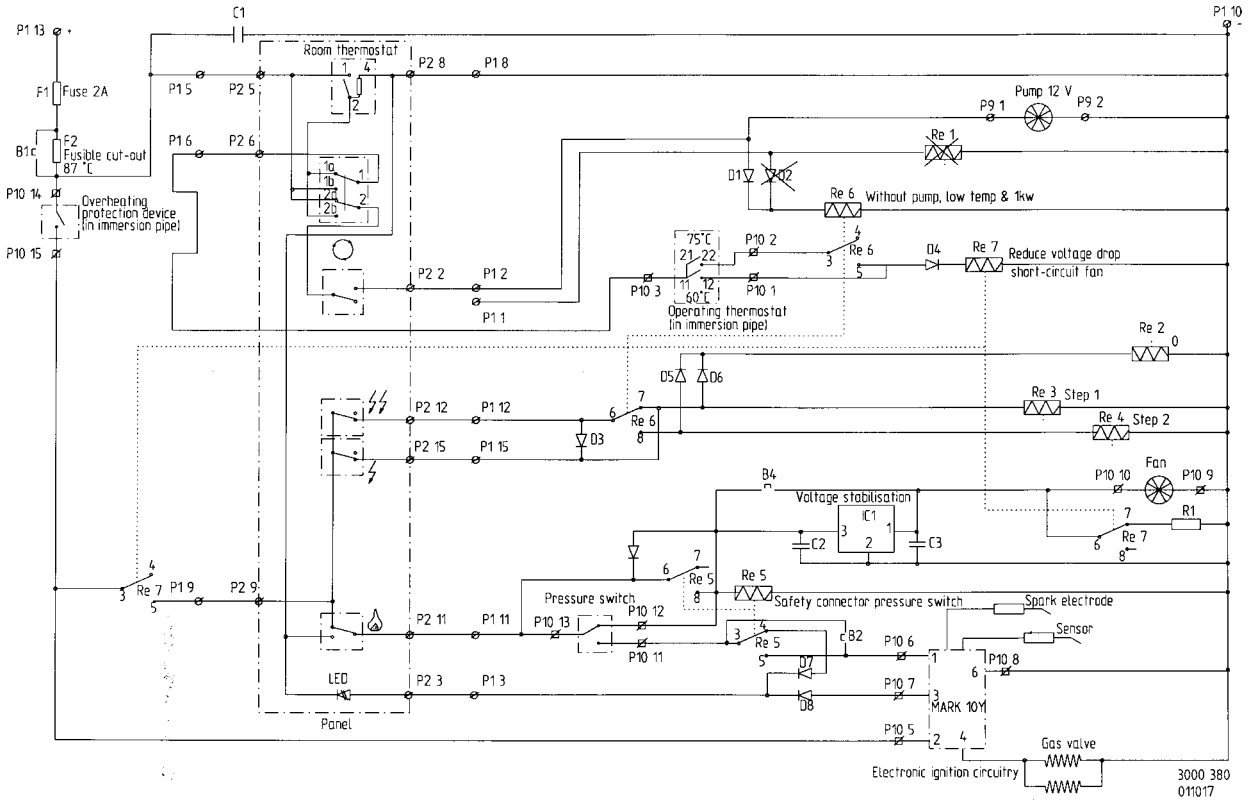
6:0 Wiring diagram with control panel 3000 266





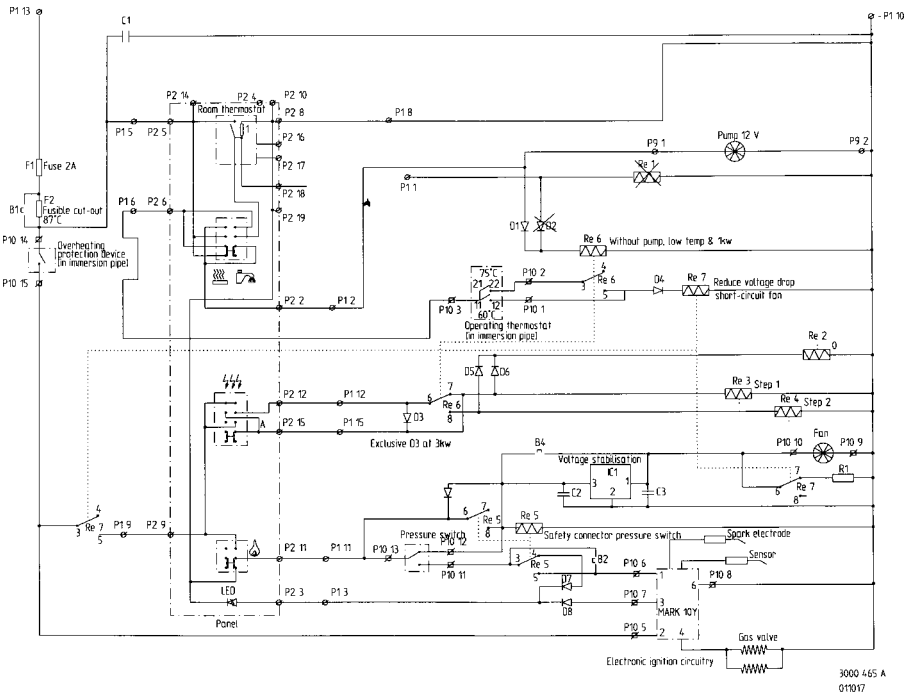
6:1 Wiring diagram with control panel 3000 380



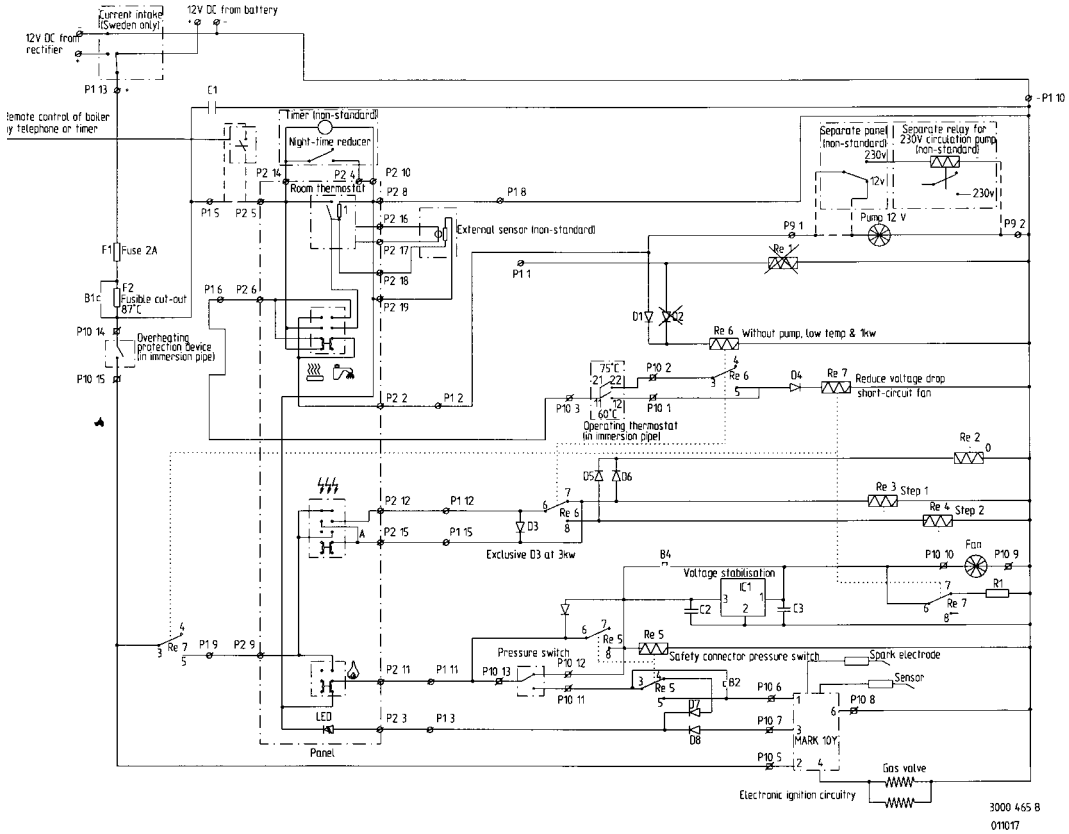


6:2 Wiring diagram for 3000 465 A, B

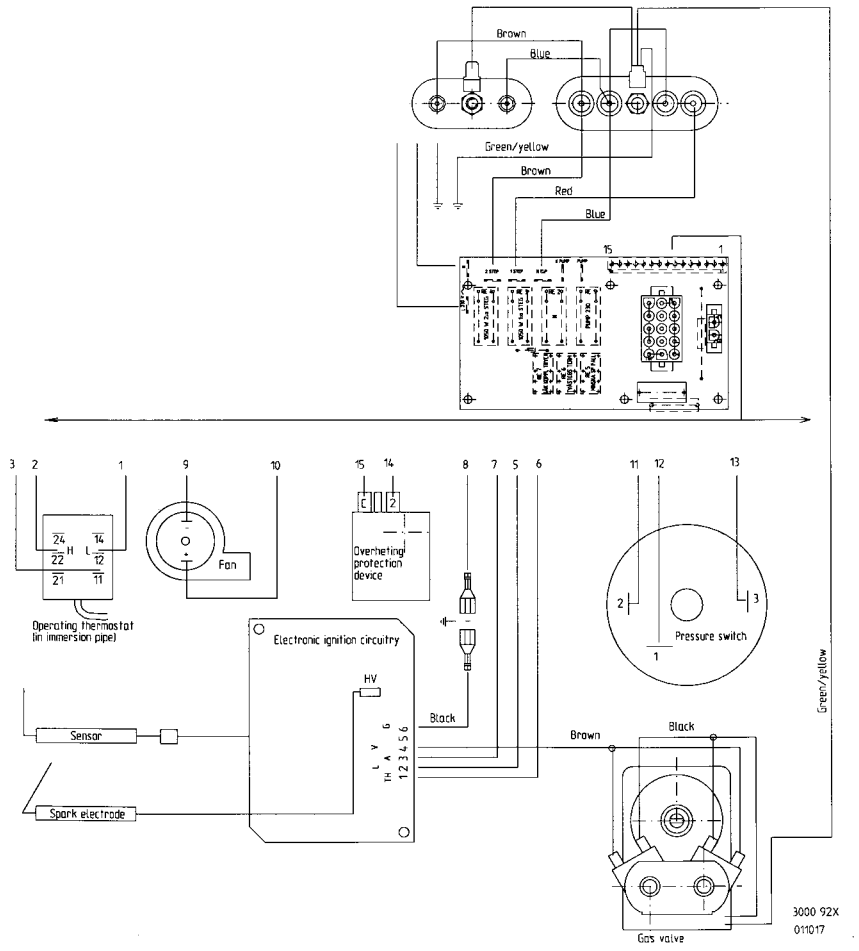
A.



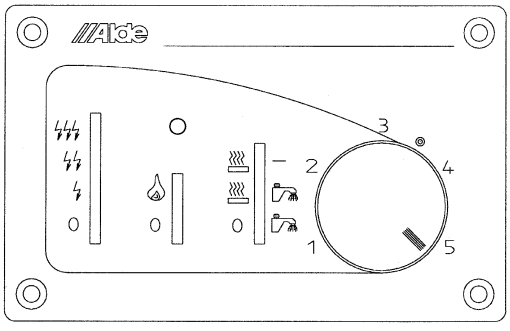
B.



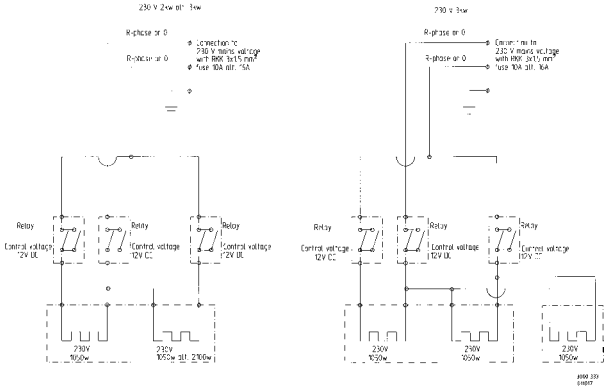
6:3 Circuit diagram 12 V and 230 V~



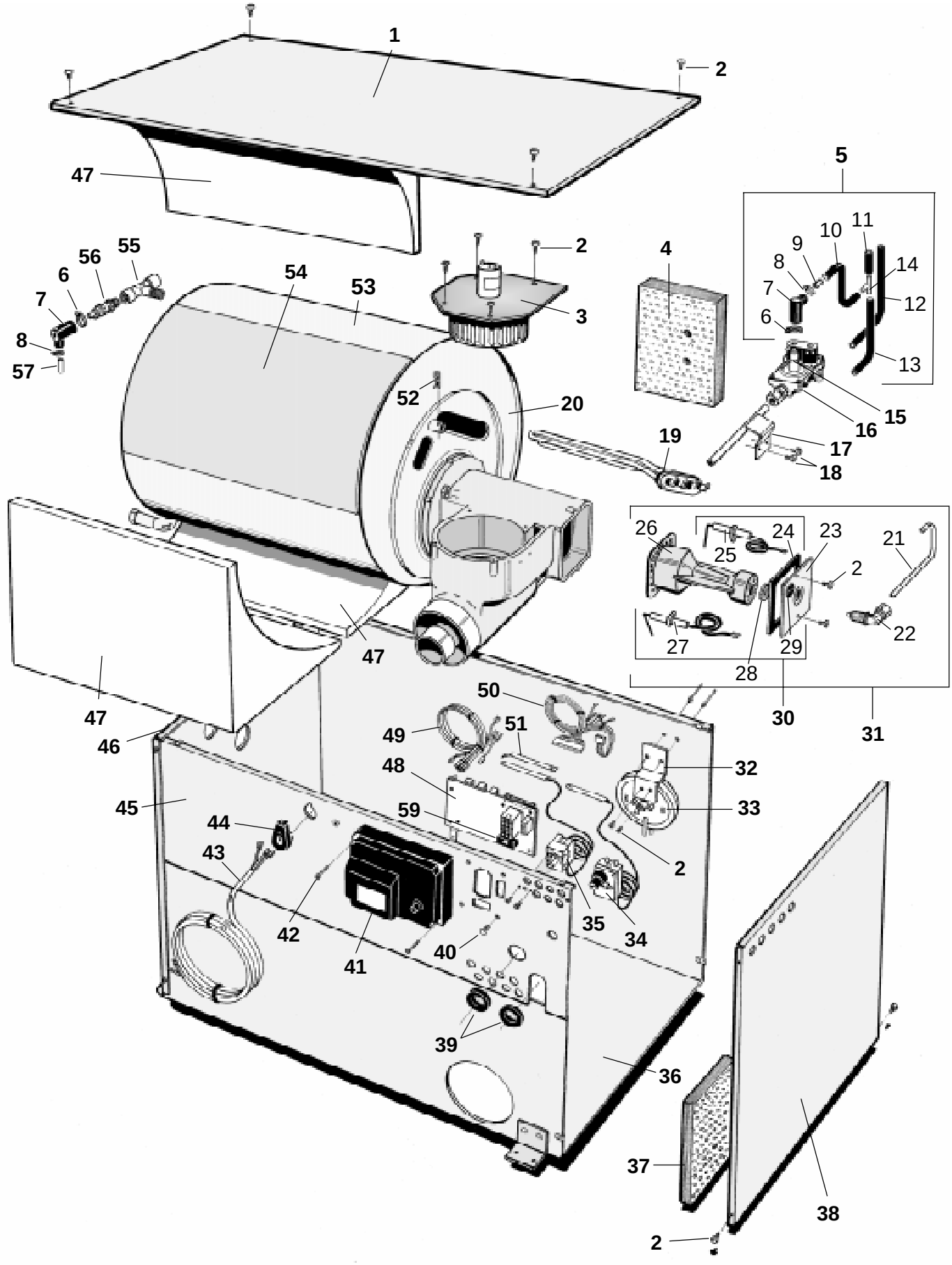
6:4 Control panel 3000 465



6:5 Flow chart 230 V~



7:0 Exploded diagram



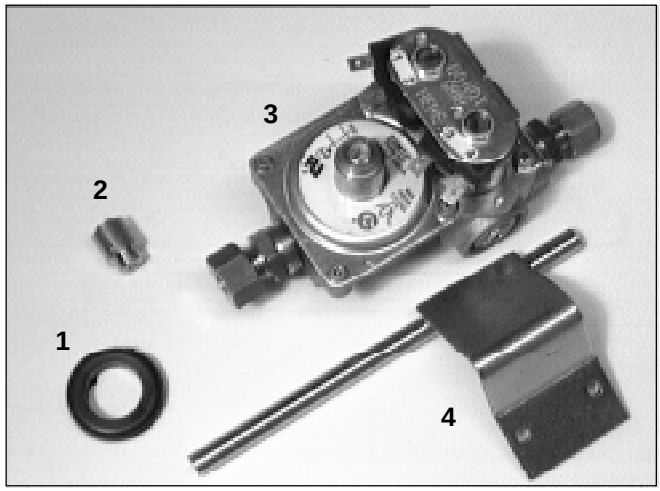
7:1 Article numbers for exploded diagram

1. **3000 133** Metal cover
2. **2900 258** Self-tapping screw B6 x 9.5
3. **3000 195** Fan compl. (for 921)
   3000 452 Fan compl. (for 92x and 93x)
   3000 409 Fan compl. (for 94x)
4. **3000 247** Insulation
5. **3000 411** Hose connection compl.
6. **3000 372** Double clip
7. **3000 297** Rubber cap
8. **3000 324** Double clip
9. **2930 414** Sleeve
10. **3000 196** Rubber hose, L=190 mm
11. **3000 196** Rubber hose, L=55 mm
12. **3000 196** Rubber hose, L=125 mm
13. **3000 196** Rubber hose, L=110 mm
14. **3000 138** T-piece
15. **3000 168** Soft start valve
16. **3000 289** Solenoid valve compl.
17. **3000 278** Gas pipe
18. **2737 174** Screw M4x8
19. **3000 256** Electrical heating cartridge 1kW
    3000 250 Electrical heating cartridge 2kW
    3000 315 Electrical heating cartridge 3kW
    3000 255 Blind plug for electrical heating cartridge
20. **3000 240** Plug
21. **3000 159** Pipe
22. **3000 379** Angle connector
23. **3000 204** End plate
24. **3000 213** Gasket
25. **3000 206** Flame sensor
26. **3000 374** Burner (92x, 93x)
    3000 398 Burner (94x)
27. **3000 205** Spark electrode
28. **3000 383** Nut
29. **2930 235** Cable grommet
30. **3000 407** Ignition kit compl.
31. **3000 385** Burner compl. (for 92x, 93x)
    3000 408 Burner compl. (for 94x)
32. **3000 368** Angle bracket
33. **3000 127** ”SIT” pressure switch
34. **3000 362** Overheating protection device compl.
35. **3000 365** Operating thermostat compl.
36. **3000 185** Casing
37. **3000 246** Insulation
38. **3000 132** Front end plate
39. **3000 231** Grommet
40. **3000 232** Plastic spacer
41. **3000 157** Electronic ignition unit
42. **7410 325** Self-tapping screw 2.9x25
43. **3000 286** Mains supply cable
44. **2762 125** Cable clamp
45. **3000 351** Service panel
46. **3000 131** Rear end plate
47. **3000 261** Insulation
48. **3000 330** Printed circuit board (for 921)
    3000 333 Printed circuit board (for 3 kW heating cartridge)
    3000 334 Printed circuit board (for 2 kW heating cartridge)
49. **3000 367** Wiring loom for 230 V
50. **3000 184** Wiring loom
51. **3000 327** Spring
52. **4071 011** Retaining clip
53. **3000 460** Boiler body compl.
54. **3000 251** Insulation
55. **2959 120** T-piece
56. **3000 290** Pressure relief valve
57. **3000 143** Pipe
58. **3000 363** Jet ”230”
59. **3000 166** Fuse 2 A

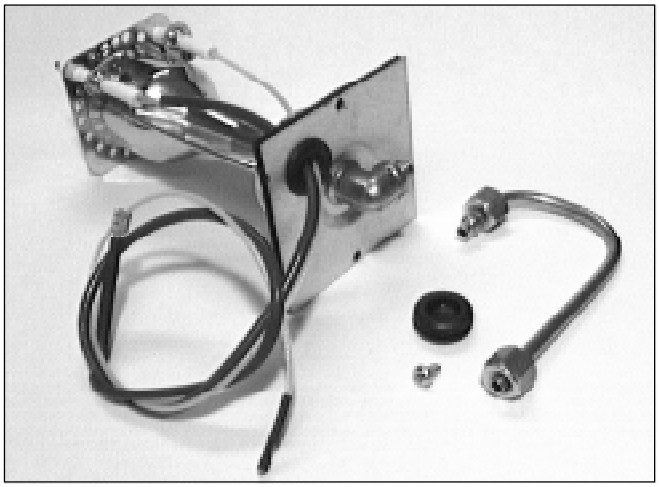
8:0 Reservdelar

1. **3000 195** Fan complete (12 V for 3000 901-921)
2. **3000 452** Fan complete (9 V for 3000 92x-93x)
3. **3000 409** 3000 452 Fan complete (9 V for 3000 94x)

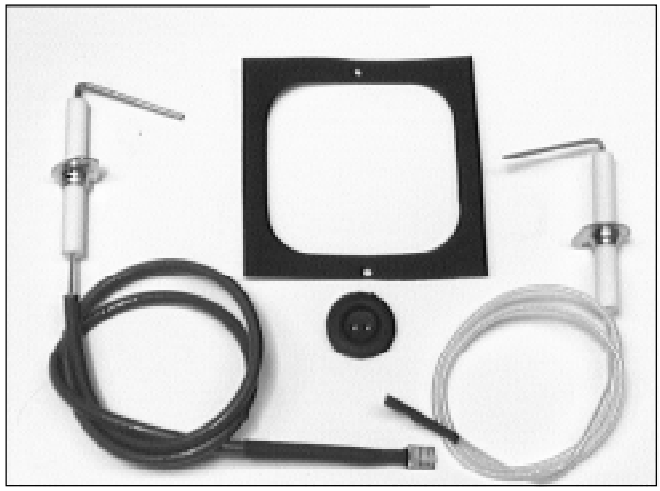
Packed in cardboard box with Allen key for impeller.



1. **3000 231** Grommet
2. **3000 168** Soft start valve
3. **3000 289** Solenoid valve compl. with soft start valve
4. **3000 278** Gas pipe

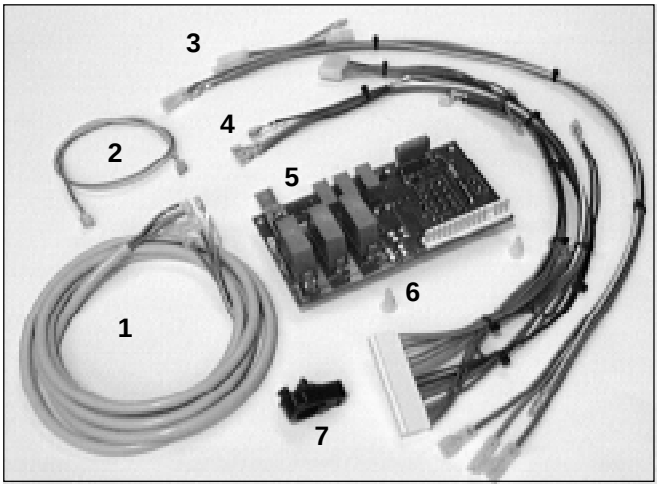


3000 385 Burner compl. (for 92x-93x)(Ø 1.8 mm net)
3000 408 Burner compl. (for 94x)(Ø 2.0 mm net)

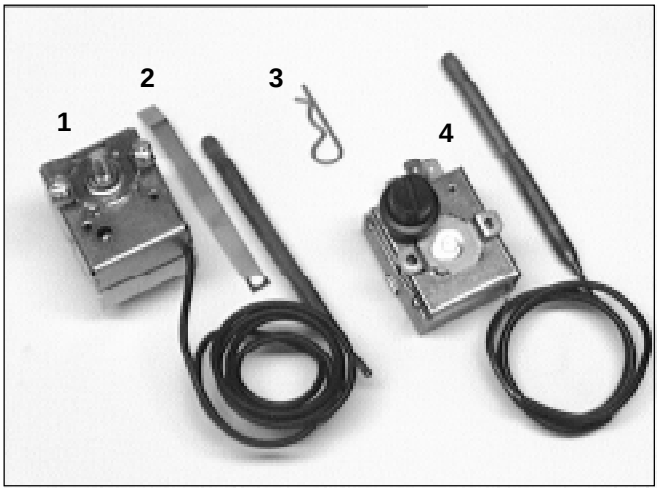


3000 407 Ignition kit incl. spark electrode, flame sensor, cable grommet and gasket (for all models

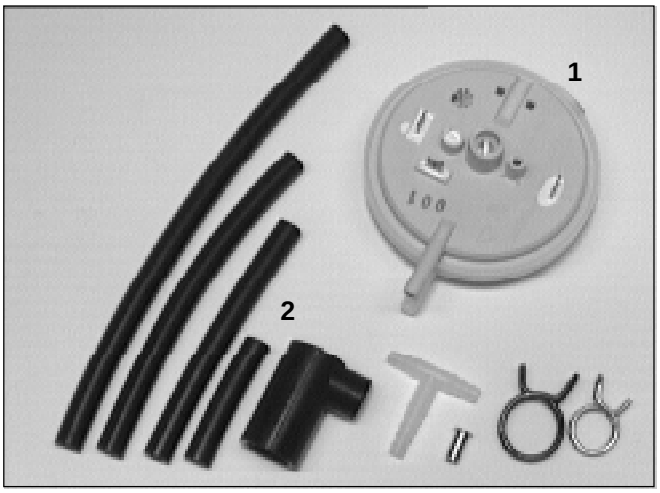
8:0 Reservdelar



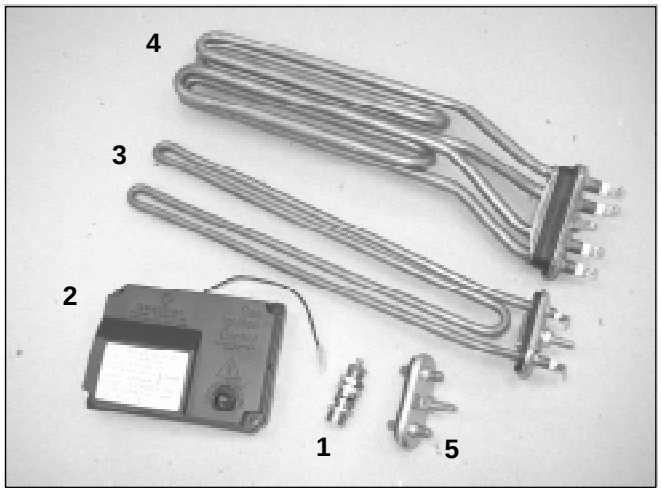
1. **3000 286** Mains supply cable
2. **3000 280** Cable
3. **3000 367** Wiring loom
4. **3000 184** Wiring loom
5. **3000 330** Printed circuit board (921)
   3000 333 Printed circuit board (92x-94x with 3 kW heating cartridge
   3000 334 Printed circuit board (92x-94x with 2 kW heating cartridge
6. **3000 232** Spacer
7. **2762 125** Cable clamp



1. **3000 365** Operating thermostat ”lmit” including retaining clip
2. **3000 327** Spring
3. **4071 011** Retaining clip
4. **3000 362** Overheating protection device ”lmit” compl.



1. **3000 127** ”SIT” pressure switch
2. **3000 411** Hose connection for pressure switch



1. **3000 290** Pressure release valve
2. **3000 157** Electronic ignition unit
3. **3000 256** Electrical heating cartridge 1 kW
4. **3000 250** Electrical heating cartridge 2 kW
   3000 315 Electrical heating cartridge 3 kW
5. **3000 255** Blind plug for electrical heating cartridge

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